IN THE CLAIMS:

Please amend claims 1, 6 and 12 as follows:

1. (Currently Amended) A method for auto-addressing devices on a multiplexing bus having a master control module and a plurality of slave devices arranged in series, with each slave device having an address register, a bus in and a bus out, an initial content of the address register of each slave device being zero, the method comprising the steps of:

a) outputting a bus signal having a high state from said master control module, said bus signal being sequentially passed to said plurality of slave devices in the series, each of said slave devices determining a content of its respective address register and inverting the bus in to an inverted bus out only if said respective address register content is zero;

b) updating the address register content with each bus out value for each slave device, respectively; and

c) repeating steps a and b until a resulting number of stored bus out values equals $\log_2(n)$, where n is a number of slave devices, at which time an address of each of said slave devices has been determined.

2. (Original) The method as set forth in claim 1, wherein during a first measurement, each slave device inverts the bus

signal received on its respective bus in because the address register content of each slave device is zero.

3. (Original) The method as set forth in claim 2, wherein during a second measurement following said first measurement, a first half of said slave devices invert their respective bus in signals and a second half of said slave devices pass their respective bus in signals to bus out without inversion, said second half having a non-zero address register content stored from said first measurement.

4. (Original) The method as set forth in claim 3, wherein during a third measurement following said second measurement, half of said first half of said slave devices invert their respective bus in signals and a remainder of said slave devices pass their respective bus in signals to bus out without inversion, said remainder having a non-zero address register content stored from at least one of said first and second measurements.

5. (Original) The method as set forth in claim 3, wherein during a last measurement, only one slave device inverts its bus

in signal, a remainder of said slave devices passing their respective bus in signals to bus out without inversion, said remainder having a non-zero address register content stored from at least one previous measurement.

6. (Currently Amended) A method for auto-addressing devices on a multiplexing bus having a master control module and a plurality of slave devices arranged in series, with each slave device having an address register, a bus in and a bus out, the method comprising the steps of:

a) receiving, by each slave device, a bus signal at the bus in, said bus signal having a first state;

b) determining, by each slave device, whether a content of its respective address register is "0";

c) inverting said bus signal from said first state to a second state by each slave device having an address register content of "0" and outputting the bus signal with said second state on the bus out, while each slave device having an address register content other than "0" outputs the bus signal in said first state on the bus out;

d) storing an output state of each slave device to its respective address register, an output state of said first state

being a "1" and an output state of said second state being a "0"; and

e) repeating steps a through d for a number of measurements equal to $\log_2(n)$, where n is a total number of said plurality of slave devices, an address of each slave device being determined upon conclusion of said number of measurements.

7. (Original) The method as set forth in claim 6, wherein prior to a first measurement, each of said slave devices sets its respective address register to "0" in response to receiving a command signal from said master control module.

8. (Original) The method as set forth in claim 7, wherein during a first measurement following receipt of said command signal, each slave device inverts the bus signal received on its respective bus in.

9. (Original) The method as set forth in claim 8, wherein during a second measurement following said first measurement, a first half of said slave devices invert their respective bus in signals and a second half of said slave devices pass their respective bus in signals to bus out without inversion.

10. (Original) The method as set forth in claim 9, wherein during a third measurement following said second measurement, half of said first half of said slave devices invert their respective bus in signals and a remainder of said slave devices pass their respective bus in signals to bus out without inversion.

11. (Original) The method as set forth in claim 9, wherein during a last measurement of said number of measurements, only one slave device inverts its bus in signal, a remainder of said slave devices passing their respective bus in signals to bus out without inversion.

12. (Currently Amended) A method for auto-addressing devices on a multiplexing bus having a master control module and a plurality of slave devices arranged in series, with each slave device having a bus in, a bus out, and an address register for storing respective output states with a low output state stored as "0" and a high output state stored as "1", the method comprising the steps of:

initializing, in response to a command signal received from said master control module, the address register of each of said plurality of slave devices to "0";

setting a measurement counter such that a total number of measurements is equal to $\log_2(n)$, where n is a number of said slave devices;

receiving, at the bus in of a first slave device, a first bus signal having a high state from said master control module;

inverting said first bus signal from said high state to a low state in response to the address register of said first device being "0" and outputting at bus out the low state first bus signal;

receiving, at the bus in of a second slave device, the low state first bus signal;

inverting said low state first bus signal to a high state in response to the address register of said second device being "0" and outputting at bus out a high state first bus signal;

receiving, at the bus in of an nth slave device, a first (n-1) bus out signal from an (n-1) slave device;

inverting said first (n-1) bus out signal in response to the address register of said nth device being "0" and outputting at bus out an inverted first (n-1) bus out signal;

storing by each of said first through nth devices in their respective address registers, a respective first output state at bus out as a first measurement;

receiving, at the bus in of said first slave device, a second bus signal having a high state from said master control module;

inverting said second bus signal from said high state to a low state in response to the address register of said first device being "0" and outputting at bus out the low state second bus signal;

receiving, at the bus in of said second slave device, the low state second bus signal;

passing said low state second bus signal to bus out without inversion in response to the address register of said second device not being "0";

receiving, at the bus in of said nth slave device, a second (n-1) bus out signal from said (n-1) slave device;

inverting said second (n-1) bus out signal only if the address register of said nth device is "0" such that an inverted

second (n-1) bus out signal is output if the address register is "0" and said second (n-1) bus out signal is output unchanged if the address register is not "0";

storing by each of said first through nth devices in their respective address registers, a respective second output state at bus out as a second measurement; and

receiving, at the bus in of said first slave device, an nth bus signal having a high state from said master control module and completing with said first, second through nth slave devices the total number of measurements such that an address of each slave device is determined.